Ontario

2022

Science and Technology
Grade 7

OVERALL AND SPECIFIC EXPECTATIONS

STRAND A: STEM Skills and Connections

A

Throughout Grade 7, in connection with the learning in the Life Systems, Matter and Energy, Structures and Mechanisms, and Earth and Space Systems strands, students will:

A1. STEM Investigation and Communication Skills: use a scientific research process, a scientific experimentation process, and an engineering design process to conduct investigations, following appropriate health and safety procedures

A1.1 use a scientific research process and associated skills to conduct investigations

A1.2 use a scientific experimentation process and associated skills to conduct investigations

A1.3 use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems

A1.4 follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials

A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes

A2. Coding and Emerging Technologies: use coding in investigations and to model concepts, and assess the impact of coding and of emerging technologies on everyday life and in STEM-related fields

A2.1 write and execute code in investigations and when modelling concepts, with a focus on planning and designing programs

A2.2 identify and describe impacts of coding and of emerging technologies, such as artificial intelligence systems, on everyday life, including skilled trades

A3. Applications, Connections, and Contributions: demonstrate an understanding of the practical applications of science and technology, and of contributions to science and technology from people with diverse lived experiences

A3.1 describe practical applications of science and technology concepts in various occupations, including skilled trades, and how these applications address real-world problems

A3.2 investigate how science and technology can be used with other subject areas to address real-world problems

A3.3 analyse contributions to science and technology from various communities

STRAND B: Life Systems
Interactions in the Environment

B

By the end of Grade 7, students will:

B1. Relating Science and Technology to Our Changing World: assess the impact of human activities and technologies on the environment, and analyse ways to mitigate negative impacts and contribute to environmental sustainability

B1.1 assess the impact of various technologies on the environment

B1.2 assess the effectiveness of various ways of mitigating the negative and enhancing the positive impact of human activities on the environment

B1.3 analyse how diverse First Nations, Métis, and Inuit practices and perspectives contribute to environmental sustainability, including by using approaches such as Two-Eyed Seeing

B2. Exploring and Understanding Concepts: demonstrate an understanding of interactions between and among biotic and abiotic components in the environment

B2.1 explain that an ecosystem is a network of interactions among living organisms and their environment

B2.2 identify biotic and abiotic components in an ecosystem, and describe the interactions between them

B2.3 describe roles and relationships between producers, consumers, and decomposers within an ecosystem

B2.4 describe the transfer of energy in a food chain, and explain the effects of altering any part of the chain

B2.5 describe how matter is cycled within the environment, and explain how the cycling of matter promotes sustainability

B2.6 explain the differences between primary succession and secondary succession in ecosystems

B2.7 explain how biotic and abiotic factors limit the number of organisms an ecosystem can sustain

B2.8 describe how different approaches to agriculture and to harvesting food from the natural environment can impact an ecosystem, and identify strategies that can be used to maintain and/or restore balance to ecosystems

STRAND C: Matter and Energy
Pure Substances and Mixtures

C

By the end of Grade 7, students will:

C1. Relating Science and Technology to Our Changing World: evaluate the environmental and social impacts of the use and disposal of various pure substances and mixtures

C1.1 analyse the social and environment impacts of the use and disposal of pure substances found in technological devices, considering local and global perspectives

C1.2 assess environmental and social impacts of different industrial methods used to separate mixtures

C2. Exploring and Understanding Concepts: demonstrate an understanding of the nature of matter, including the properties of pure substances and mixtures, and describe these properties using particle theory

C2.1 demonstrate an understanding of the particle theory of matter

C2.2 use particle theory to distinguish between pure substances and mixtures

C2.3 distinguish between homogenous and heterogenous mixtures

C2.4 use the particle theory to describe how different factors affect the solubility of a substance and the rate at which it dissolves

C2.5 describe the concentration of a saturated solution in both qualitative and quantitative terms, and differentiate between saturated and unsaturated solutions

C2.6 explain why water is referred to as the universal solvent

C2.7 explain various processes used to separate mixtures, including solutions, into their components, and identify some applications of these processes

C2.8 describe pure substances as elements and compounds consisting of atoms and combinations of atoms

STRAND D: Structures and Mechanisms
Form, Function, and Design of Structures

D

By the end of Grade 7, students will:

D1. Relating Science and Technology to Our Changing World: analyse personal, social, economic, and environmental factors that should be considered when designing and building structures

D1.1 evaluate environmental, social, and economic factors that should be considered when designing and building structures to meet specific needs for individuals and communities

D1.2 evaluate the impact of the ergonomic design of various tools, objects, and work spaces on a user's health, safety, and ability to work efficiently, and use this information to describe changes that could be made in their own spaces and activities

D2. Exploring and Understanding Concepts: demonstrate an understanding of the relationship between structural forms and the forces acting on them

D2.1 classify structures as solid structures, frame structures, or shell structures

D2.2 describe ways in which the centre of gravity of a structure affects the structure's stability

D2.3 identify the magnitude, direction, point of application, and plane of application of the forces applied to a structure

D2.4 describe the role of symmetry in structures, and identify instances of symmetry in various structures

D2.5 describe factors that can cause a structure to fail

D2.6 identify the factors that determine the suitability of materials for use in manufacturing a product or constructing a structure

D2.7 describe methods engineers and other professionals use to assess, improve, and maintain the safety of structures

STRAND E: Earth and Space Systems
Heat in the Environment

E

By the end of Grade 7, students will:

E1. Relating Science and Technology to Our Changing World: assess the benefits of technologies that reduce heat loss, and analyse various social and environmental impacts of the use of energy from renewable and non-renewable sources

E1.1 assess the social and environmental benefits of technologies that reduce heat loss in enclosed spaces or heat transfer to surrounding spaces

E1.2 analyse various social, economic, and environmental impacts, including impacts related to climate change, of using non-renewable and renewable sources of energy

E2. Exploring and Understanding Concepts: demonstrate an understanding of heat as a form of energy that is associated with the movement of particles and is essential for many natural processes within Earth's systems

E2.1 use particle theory to explain how heat affects the motion of particles in a solid, a liquid, and a gas

E2.2 demonstrate an understanding of various ways in which heat is generated

E2.3 use particle theory to explain the effects of heat on volume in solids, liquids, and gases, including during changes of states of matter

E2.4 explain how heat is transmitted through conduction, and describe natural processes that are affected by conduction

E2.5 explain how heat is transmitted in liquids and gases through convection, and describe natural processes that depend on convection

E2.6 explain how heat is transmitted through radiation, and describe the effects of radiation from the Sun on different kinds of surfaces

E2.7 describe the role of radiation in heating and cooling Earth, and explain how greenhouse gases affect the transmission of radiated heat through the atmosphere

E2.8 identify common sources of greenhouse gases, including sources resulting from human activity, and describe how humans can reduce emissions of these gases